

Book review

Apoptosis II: The Molecular Basis of Apoptosis in Disease

Edited by L David Tomei and Frederick O Cope

Cold Spring Harbor Laboratory Press, New York. 1994. 430pp. \$65. ISBN 0-87969-395-9

Two years ago I read the first volume devoted to apoptosis edited by Tomei and Cope. It gave me an excellent introduction to research into the cell biology of apoptosis, with a perspective based on two decades of research. I am even more delighted to report that the second volume highlights some of the exciting topics of research that deal with issues of molecular pathophysiology and pathogenesis, beginning with a disease process and ending with apoptosis. Despite a diverse subject matter and sixteen different topics from experts in their respective fields, the book is very readable. Each chapter introduces the reader to the subject matter in a concise, thoughtful fashion, usually drawing from a broad, historical perspective, then quickly focusing on the particular topic. Although each of the chapters is a stand-alone article, the volume has a unified feel to it and, in a didactic sense, the whole work is greater than the sum of its parts. In that sense, this volume makes an excellent text for a course in molecular medicine.

In the first two chapters the authors deal with the mechanism(s) for apoptosis in T lymphocytes during HIV-1 infection, exploring the role of superantigens and HIV-1 envelope glycoproteins. The subject matter in the third chapter lucidly explores the role of the proto-oncogenes *bcl-2* and *c-myc* in regulating apoptosis in relation to the immune system. In the fourth chapter the authors review the mechanisms underlying baculovirus infection of insect hosts and demonstrate that experimental data supports the hypothesis that apoptosis of infected cells serves as an antiviral defense mechanism. In the fifth chapter the authors review the ability of adenoviral oncogenes to regulate apoptosis. In the sixth chapter the authors explore the role of tissue transglutaminases as intracellular effectors for the ultrastructural changes associated with apoptosis. The seventh chapter contains an in-depth exegesis of the relationship between mitosis and apoptosis in epidermal homeostasis. In the eighth chapter the authors present detailed analyses of the biochemistry and molecular biology of apoptosis in human leukemia. In the ninth chapter the authors use the androgen-ablation model of apoptosis in the prostate to delineate the hormonal control of prostatic glandular epithelial cells. In the tenth chapter the authors elegantly discuss similarities and differ-

ences between apoptosis and cellular senescence as two forms of irreversible growth arrest that may be modulated by the same genes. Using hormone-dependent tissues as model systems, the authors in the eleventh chapter investigate the potential roles for secondary death genes or thanatogens, genes that are responsible for the morphological and biochemical processes that result in cell dissolution and phagocytosis, as well as the role of transcription factors in mediating the expression of these secondary thanatogens. In the twelfth chapter the author explores the role of the Fas antigen, a cell surface protein that is a member of the tumor necrosis factor and nerve growth factor receptor family, in mediating apoptosis in the thymus. The authors in the thirteenth chapter critically review the evidence for the *c-myc* gene functioning as a 'death gene' in apoptosis. The authors in the fourteenth chapter discuss changes in nuclear matrix proteins as a step in the cell death program. The authors in the fifteenth chapter present intriguing data to support the hypothesis that, with increasing age, cells lose their ability to respond to apoptotic signals that would result in programmed cell death. In the sixteenth chapter, the author elegantly presents a framework for the concept that genes that modulate neuronal apoptosis also modulate necrosis. Additionally, the author explores the role for reactive oxygen species as mediators of neuronal death and demonstrates that the p75 receptor for nerve growth factor can induce or inhibit apoptosis in the nervous system in a context-dependent fashion.

This volume has brought together relatively diverse research topics with the common theme of the role in apoptosis in cancer, immune function, aging, infectious disease, and neurodegenerative disorders. It serves as an excellent introduction to the multidisciplinary field of apoptosis research for the student, physician, and researcher. It provides a solid framework for understanding much of the new therapeutic approaches in molecular medicine, especially with respect to oncology and neurodegenerative disorders. I recommend this book with great enthusiasm to anybody with an interest in the role of apoptosis in medicine.

Harris A Gelbard
University of Rochester Medical Center
Rochester, NY, USA